ISBN 0-7729-2981-5

UPDATE REPORT

PRIORITY CHEMICAL LOADINGS FROM ONTARIO POINT SOURCES DISCHARGING TO THE NIAGARA RIVER

1981 TO 1987

September, 1987

Ontario
Ministry of the Environment

The Honourable
Jim Bradley
Minister

Rod McLeod
Deputy Minister

UPDATE REPORT

PRIORITY CHEMICAL LOADINGS FROM ONTARIO POINT SOURCES DISCHARGING TO THE NIAGARA RIVER

1981 TO 1987

prepared by:

Niagara River Improvement Project
Ontario Ministry of the Environment

September 1987

ISBN NO. 0-7729-2981-5

TABLE OF CONTENTS

	Page
List of Tables	3
List of Figures	5
Introduction	6
Atlas Specialty Steels Division	8
Cyanamid of Canada Ltd. -- Welland Plant	16
Cyanamid of Canada Ltd. -- Niagara Falls Plant	24
Fleet Manufacturing	31
Niagara Falls (Stamford) WPCP	39
Welland (River Road) WPCP	46
Port Erie (Anger Avenue) WPCP	54
McMaster Avenue Combined Sewer (City of Welland)	62

List of Tables

	Page
Atlas Specialty Steels Division	
Priority Pollutant Loadings	
Table 1: 1981/1982 NRTC Survey	10
Table 2: 1983 Niagara River Improvement Team Survey	11
Table 3: 1984 Niagara River Improvement Team Survey	12
Table 4: 1985 Niagara River Improvement Team Survey	13
Table 5: 1986/1987 Niagara River Improvement Team Survey	14
Cyanamid of Canada Ltd. -- Welland Plant	
Priority Pollutant Loadings	
Table 6: 1981/1982 NRTC Survey	18
Table 7: 1983 Niagara River Improvement Team Survey	19
Table 8: 1984 Niagara River Improvement Team Survey	20
Table 9: 1985 Niagara River Improvement Team Survey	21
Table 10: 1986/1987 Niagara River Improvement Team Survey	22
Cyanamid of Canada Ltd. -- Niagara Falls Plant	
Priority Pollutant Loadings	
Table 11: 1981/1982 NRTC Survey	25
Table 12: 1983 Niagara River Improvement Team Survey	26
Table 13: 1984 Niagara River Improvement Team Survey	27
Table 14: 1985 Niagara River Improvement Team Survey	28
Table 15: 1986/1987 Niagara River Improvement Team Survey	29
Fleet Manufacturing	
Priority Pollutant Loadings	
Table 16: 1981/1982 NRTC Survey	32
Table 17: 1983 Niagara River Improvement Team Survey	33
Table 18: 1984 Niagara River Improvement Team Survey	34
Table 19: 1985 Niagara River Improvement Team Survey	35
Table 20: 1986/1987 Niagara River Improvement Team Survey	36
Niagara Falls (Stamford) WPCP	
Priority Pollutant Loadings	
Table 21: 1981/1982 NRTC Survey	40
Table 22: 1983 Niagara River Improvement Team Survey	41
Table 23: 1984 Niagara River Improvement Team Survey	42
Table 24: 1985 Niagara River Improvement Team Survey	43
Table 25: 1986/1987 Niagara River Improvement Team Survey	44
Welland (River Road) WPCP	
Priority Pollutant Loadings	
Table 26: 1981/1982 NRTC Survey	48
Table 27: 1983 Niagara River Improvement Team Survey	49
Table 28: 1984 Niagara River Improvement Team Survey	50
Table 29: 1985 Niagara River Improvement Team Survey	51
Table 30: 1986/1987 Niagara River Improvement Team Survey	52

Fort Erie (Anger Avenue) WPCP
Priority Pollutant Loadings
Table 31: 1981/1982 NRTC Survey 56
Table 32: 1983 Niagara River Improvement Team Survey 57
Table 33: 1984 Niagara River Improvement Team Survey 58
Table 34: 1985 Niagara River Improvement Team Survey 59
Table 35: 1986/1987 Niagara River Improvement Team Survey 60

McMaster Avenue Combined Sewer -- City of Welland
Priority Pollutant Loadings
Table 36: 1981/1982 NRTC Survey 64
Table 37: 1983 Niagara River Improvement Team Survey 65
Table 38: 1984 Niagara River Improvement Team Survey 66
Table 39: 1985 Niagara River Improvement Team Survey 67
Table 40: 1986/1987 Niagara River Improvement Team Survey 68

List of Figures

Page

Atlas Specialty Steels Division
Figure 1: Total Loading Trends 1981 -- 1987 15

Cyanamid of Canada Ltd. -- Welland Plant
Figure 2: Total Loading Trends 1981 -- 1987 23

Cyanamid of Canada Ltd. -- Niagara Falls Plant
Figure 3: Total Loading Trends 1981 -- 1987 30

Fleet Manufacturing
Figure 4: Total Loading Trends 1981 -- 1987 37

Niagara Falls (Stamford) WPCP
Figure 5: Total Loading Trends 1981 -- 1987 45

Welland (River Road) WPCP
Figure 6: Total Loading Trends 1981 -- 1987 53

Fort Erie (Anger Avenue) WPCP
Figure 7: Total Loading Trends 1981 -- 1987 61

McMaster Avenue Combined Sewer -- City of Welland
Figure 8: Total Loading Trends 1981 -- 1987 69

JULY, 1987

INTRODUCTION

On February 4, 1987, a Declaration of Intent was signed by representatives of four government Agencies (United States Environmental Protection Agency, New York State Department of Environmental Conservation, Environment Canada and Ontario Ministry of the Environment) to ensure that a management strategy was adopted which would enable the Agencies to move in a directed and coordinated manner toward the objective of achieving significant reductions of toxic chemical pollutants in the Niagara River. The management strategy which was adopted is known as the Niagara River Toxics Management Plan.

The fundamental objective of the Niagara River Toxics Management Plan (The Plan) is to reduce loadings of toxic chemicals to the Niagara River in accordance with a timetable and set specific activities. One of the components of The Plan involves Point Sources.

The Niagara River Toxics Committee (NRTC) in their report in October 1984 identified 10 major point source discharges in both Canada and the United States which accounted for 90% of the point source load of USEPA Priority Pollutants from all point sources based on 1982 data. Their combined loading into the Niagara River was estimated as 1203 kg/day (2650 lbs/day).

As part of The Plan, the jurisdictions were to reassess the adequacy of current and projected point source monitoring programs and to continue to determine toxic chemical loadings from point sources to the Niagara River by direct measurement.

This document provides information for the completion of Point Source Goal I, in the Plan which states: Determine the toxic chemical loadings from industrial and municipal facilities. Specifically, Activities 7 and 8, which state Report on Point Source Monitoring Data 4/85-3/86 and determine toxic chemical loadings and Report on Point Source Monitoring Data 4/86-3/87 and determine toxic chemical loadings, respectively.

In addition to reporting of data required to complete the activities stated above, the Ontario Ministry of the Environment has summarized all the available data collected from the Ontario Niagara River significant point sources for the years 1981/1982 (which is the baseline used in the NRTC report) to the most recent data based on analytical results which included the March 1987 sampling.

In Ontario, eight point sources were determined by the NRTC as being significant. A significant point source was defined as one

whose effluent contained as least one individual priority pollutant or 4AAP phenol result in excess of an arbitrarily set cut-off level. The eight Ontario significant point source discharges originated from Atlas Specialty Steels Division in Welland; two Cyanamid of Canada Limited facilities - one in Welland and the other in Niagara Falls; Fleet Manufacturing in Fort Erie; the Niagara Falls (Stamford) WPCP; Welland (River Road) WPCP; Fort Erie (Anger Ave.) WPCP and the McMaster Avenue Combined Sewer in Welland.

Information on each of the point source discharges are summarized in the following sections of the report. Each section is structured similarly and presents information reflecting the reason why the source was deemed significant by the NRTC, background information for each source and current status of the activities at each of the point source discharges. In addition, five tables are attached for each point source discharge which includes a summary of the monitoring information collected for the given year. Individual chemical pollutants which exceed the cut-off levels for specific chemical groups as established by the NRTC are flagged in the tables. To provide visual representation of the data, a plot is presented for each point source discharge showing the trends in total chemical loading to the Niagara River. Presenting the chemical loadings as a total value may not be scientifically meaningful, however, this approach was used to maintain consistency with the information presented in the NRTC report.

It is important to highlight the fact that a limited database exists for the point source discharges and that daily loading of chemicals may fluctuate during any specific year when compared to other years. The trend of the total loading should be considered when making conclusions about any point source discharge.

JULY, 1987

ATLAS SPECIALTY STEELS DIVISION

Atlas Specialty Steels Division was identified as one of the ten most significant point source dischargers of total EPA Priority Pollutants to the Niagara River. This facility exceeded the NRTC cutoff levels for heavy metals and total organics.

BACKGROUND:

The Atlas Steels facility produces specialty and stainless steel in electric arc furnaces for the reclamation of scrap steel.

At the time of the NRTC report, Atlas Steels was identified as the largest Ontario source of total EPA Priority Pollutants on the Niagara River at approximately 74 kg/day.

Heavy metals were the predominant factor in this loading at 70.2 kg/day, and the most significant contributors to this loading were chromium and nickel at 30 kg/day each.

Two organics, di-n-butyl Phthalate (0.38 kg/day), a plasticizer, and Trichloroethylene (3.0 kg/day), a degreasing solvent, also exceeded an arbitrary NRTC cutoff level of 0.227 kg/day.

A ministry Control Order which expired in September, 1987, required the installation of effluent controls consisting of north and south filtration plants with recycling, oil-water separation and a waste acid solidification plant for acid and alkaline liquid waste streams.

Discharge monitoring results indicate a substantial reduction in heavy metals from NRTC levels has been achieved with institution of these controls.

STATUS:

Chromium and nickel concentrations have been substantially reduced.

The Ministry and Atlas Steels will both continue monitoring to ensure compliance with MOE requirements.

Although the loading of heavy metals has been substantially reduced, the loadings still exceed the arbitrary NRTC cutoff levels.

The results of industrial self monitoring (IMIS) have shown that

excursions of heavy metals (chromium and cadmium) were evident during most of the 1986 calender year. Chromium exceeded discharge guidelines on four occasions during the year while cadmium exceeded the discharge guidelines on seven occasions. Suspended solids loading to the Welland River were also in exceedance of discharge guidelines. During the 1986 shut down period, Atlas Steels undertook process modifications to the wastewater system to further reduce solids loading in the discharges.

A Preventive Maintenance Survey by the Ministry of the Environment under Section 17 of the Environmental Protection Act found that numerous pollution control devices had broken down and that these breakdowns resulted in the release of excess contaminants to the environment.

As a result of the Section 17 survey, a Control Program is being prepared to ensure that maintenance of essential pollution control devices remains a top priority.

TABLE 1
ATLAS SPECIALTY STEELS DIVISION
PRIORITY POLLUTANT LOADINGS
1981/1982 Niagara River Toxics Committee Survey
Flow = 27200 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			70.4752
Arsenic	0.0272		
Chromium	32.6400	*	
Copper	1.3600	*	
Lead	4.6240	*	
Nickel	27.2000	*	
Zinc	4.6240	*	
TOTAL PHENOLICS (4AAP)	0.1088		0.1088
CYANIDE	not detected		
VOLATILE ORGANICS			3.1779
trans 1,2 dichloroethylene	0.0091		
Trichloroethylene	3.0373	*	
1,1,1 Trichloroethane	0.0363		
Toluene	0.0952		
EXTRACTABLE ORGANICS			0.5485
Acenaphthylene	0.0091		
Naphthalene	0.0045		
di-n-butyl Phthalate	0.3808	*	
di-n-octyl Phthalate	0.0272		
bis (2-ethylhexyl) Phthalate	0.1269		
OC PESTICIDES			0.0047
Aldrin	0.0004		
A-BHC	0.0002		
G-BHC	0.0002		
p,p'-DDT	0.0037		
Endosulfan	0.0002		
TOTAL LOADING			74.3151

NOTE: * denotes values above cut-off limits

TABLE 2
ATLAS SPECIALTY STEELS DIVISION
PRIORITY POLLUTANT LOADINGS
1987 Niagara River Improvement Team Survey
Flow =28300 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			13.2571
Cadmium	0.0481		
Chromium	6.4156	*	
Copper	1.4150	*	
Mercury	0.00142		
Nickel	2.9234	*	
Lead	0.8490	*	
Zinc	1.6046	*	
TOTAL PHENOLICS (4AAP)	0.0679		0.0679
CYANIDE	0.1783		0.1783
VOLATILE ORGANICS			0.1698
Chloroform	0.0142		
Trichloroethylene	0.1556		
EXTRACTABLE ORGANICS			
none detected			
OC PESTICIDES & PBC's			
none detected			
TOTAL LOADING			13.6731

NOTE: * denotes values above cut-off limits

TABLE 3
ATLAS SPECIALTY STEELS DIVISION
PRIORITY POLLUTANT LOADINGS
1984 Niagara River Improvement Team Survey
Flow = 25600 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			15.7060
Chromium	2.6445	*	
Copper	1.7920	*	
Mercury	0.00299		
Nickel	1.1955	*	
Lead	4.5235	*	
Zinc	5.5475	*	
TOTAL PHENOLICS (4AAP)	0.0102		0.0102
CYANIDE	not detected		
VOLATILE ORGANICS			0.5786
Methylene Chloride	0.5709	*	
Chloroform	0.0044		
1,1 Dichloroethylene	0.0033		
EXTRACTABLE ORGANICS			0.0282
dibutyl Phthalate	0.0282		
OC PESTICIDES & PCB's			0.003540
A-BHC	0.000033		
PCB	0.003507		

TOTAL LOADING 16.3265
NOTE: * denotes values above cut-off limits

TABLE 4
ATLAS SPECIALTY STEELS DIVISION
PRIORITY POLLUTANT LOADINGS
1985 Niagara River Improvement Team Survey
Flow = 29000 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			18.5977
Cadmium	0.0377		
Chromium	0.1943		
Copper	0.7743	*	
Nickel	0.6757	*	
Lead	14.5000	*	
Zinc	2.4157	*	
TOTAL PHENOLICS (4AAP)	not detected		
CYANIDE	not analyzed		
VOLATILE ORGANICS			
not analyzed			
EXTRACTABLE ORGANICS			
not analyzed			
OC PESTICIDES			
not analyzed			

TOTAL LOADING 18.5977
NOTE: * denotes values above cut-off limits

TABLE 5
ATLAS SPECIALTY STEELS DIVISION
PRIORITY POLLUTANT LOADINGS
1986/1987 Niagara River Improvement Team Survey
Flow = 28400 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			12.5573
Silver	0.0312		
Arsenic	0.0937		
Beryllium	0.0937		
Chromium	3.6608	*	
Copper	1.2950	*	
Nickel	3.2819	*	
Zinc	4.1010	*	
TOTAL PHENOLICS (4AAP)	0.0511		0.0511
CYANIDE	0.0284		0.0284
VOLATILE ORGANICS			0.5867
Chloroform	0.0011		
Trichloroethylene	0.0009		
Benzene	0.0244		
1,3 dichlorobenzene	0.0011		
Ethylbenzene	0.0974		
Toluene	0.0568		
o-Xylene	0.1096		
m-Xylene	0.2954	*	
EXTRACTABLE ORGANICS			0.3919
di-n-octyl Phthalate	0.0568		
Naphthalene	0.3351	*	
OC PESTICIDES			
none detected			

TOTAL LOADING 13.6155

NOTE: * denotes values above cut-off limits


Atlas Specialty Steels Division
Welland
Total Loading (kg/day)
100
90
80
70
60
50
40
30
20
10
0
1981/82
1983
1984
1985
1986/87
Monitoring Year
Total Loading (kg/d

JULY, 1987

CYANAMID OF CANADA LTD. WELLAND PLANT

This facility was identified by the NRTC to exceed cutoff levels for heavy metals and cyanide.

BACKGROUND:

The Cyanamid of Canada Ltd. plant located in Welland manufactures primarily nitrogenous fertilizers at this facility.

An extensive Environmental Protection Act Section 126 survey was performed by the MOE and resulted in a Control Order being issued to the company in 1977. An amendment to the Order was issued in September 1984, allowing the company an additional six months to reduce toxicity and achieve effluent quality, specifically identifying ammonia as a chemical of concern.

At the time of the NRTC report, this facility was identified as the source of 9.9 kg/day of heavy metals (primarily chromium) and 2.2 kg/day of cyanide.

STATUS:

Abatement measures installed under the Control Order include chromium removal, ion exchange neutralization units, scrubbers, filtration units and a nitrogen containment and recycle system.

A major direct discharge from this plant to the Welland River has been eliminated. Process streams have been redirected to the on-site wastewater treatment system.

Cyanamid also eliminated a cooling water discharge which was a source of chromium.

Monitoring in recent years has shown an increase in the loading of heavy metals and cyanide. Due to this increase, an extensive survey of the Cyanamid facility was undertaken by the Ministry of the Environment's Niagara River Improvement Project.

Coincident with the MOE survey, Cyanamid ceased the operations of approximately 50% of plant operations, specifically urea, nitric acid and ammonium nitrate manufacturing.

Results of the survey are pending. The company will still be required to operate within the limitations imposed on it by the Provincial Control Order which expired in 1985.

The company was in compliance with Provincial Effluent guidelines for 1986 according to the IMIS database.

TABLE 6
CYANAMID OF CANADA LTD. WELLAND PLANT
PRIORITY POLLUTANT LOADINGS
1981/1982 Niagara River Toxics Committee Survey
Flow = 17200 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			9.9645
Antimony	0.0009		
Arsenic	0.0594		
Chromium	4.8660	*	
Copper	0.6515	*	
Mercury	0.00370		
Nickel	2.3391	*	
Selenium	0.0037		
Zinc	2.0402	*	
TOTAL PHENOLICS (4AAP)	0.1678		0.1678
CYANIDE	2.2850	*	2.2850
VOLATILE ORGANICS			0.3539
Benzene	0.0283		
Bromodichloromethane	0.0010		
Chloroform	0.0450		
Dichlorobromomethane	0.0001		
1,1 Dichloroethane	0.1642		
1,2 Dichloroethane	0.0113		
Ethylbenzene	0.0056		
Methylene Chloride	0.0244		
Tetrachloroethylene	0.0004		
Toluene	0.0679		
1,1,1 Trichlroethane	0.0017		
Trichloroethylene	0.0040		
EXTRACTABLE ORGANICS			0.2959
Acenaphthene	0.0042		
Anthracene	0.0010		
Fluoranthene	0.0010		
Naphthalene	0.0013		
Phenanthrene	0.0074		
Pyrene	0.0020		
di-n-butyl Phthalate	0.1369		
di-ethyl Phthalate	0.0438		
di-n-octyl Phthalate	0.0108		
bis (2-ethylhexyl) Phthalate	0.0915		
OC PESTICIDES			0.003112
A-BHC	0.000078		
B-BHC	0.000595		
G-BHC	0.000191		
D-BHC	0.000990		
Chlordane	0.000003		
p,p'-DDT	0.000160		
Endosulfan I	0.000910		
Endosulfan II	0.000160		
Heptachlor Epoxide	0.000023		
Dieldrin	0.000002		
TOTAL LOADING			13.0742

NOTE: * denotes values above cut-off limits

TABLE 7
CYANAMID OF CANADA LTD. WELLAND PLANT
PRIORITY POLLUTANT LOADINGS
1982 Niagara River Improvement Team Survey
Flow =21165 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			4.6552
Chromium	2.1165	*	
Copper	0.7048	*	
Mercury	0.00106		
Lead	0.2815		
Zinc	1.5514	*	
TOTAL PHENOLICS (4AAP)	1.3101	*	1.3101
CYANIDE	0.5355	*	0.5355
VOLATILE ORGANICS			0.0077
Chloroform	0.0028		
Benzene	0.0042		
Toluene	0.0007		
EXTRACTABLE ORGANICS			0.2117
Dibutyl Phthalate	0.0423		
Diisooctyl Phthalate	0.1693		
OC PESTICIDES & PBC's			0.000402
Hexachlorobenzene	0.000042		
PCB	0.000360		
TOTAL LOADING			6.7206

NOTE: * denotes values above cut-off limits

TABLE 8
CYANAMID OF CANADA LTD. WELLAND PLANT
PRIORITY POLLUTANT LOADINGS
1984 Niagara River Improvement Team Survey
Flow = 25150 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			8.5520
Chromium	3.7725	*	
Copper	0.1685		
Mercury	0.00101		
Nickel	3.2695	*	
Lead	0.5860	*	
Zinc	0.7545	*	
TOTAL PHENOLICS (4AAP)	0.0528		0.0528
CYANIDE	5.5330	*	5.5330
VOLATILE ORGANICS			0.2340
Methylene Chloride	0.1929		
Chloroform	0.0226		
Benzene	0.0017		
Toluene	0.0126		
o-Xylene	0.0017		
m-Xylene	0.0025		
EXTRACTABLE ORGANICS			0.0767
dibutyl Phthalate	0.0503		
di-n-octyl Phthalate	0.0264		
OC PESTICIDES			
none detected			
TOTAL LOADING			14.4485

NOTE: * denotes values above cut-off limits

TABLE 9
CYANAMID OF CANADA LTD. WELLAND PLANT
PRIORITY POLLUTANT LOADINGS
1985 Niagara River Improvement Team Survey
Flow = 25100 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			27.3094
Cadmium	0.0326		
Chromium	6.1068	*	
Mercury	0.00058		
Nickel	1.6742	*	
Lead	0.7530	*	
Zinc	18.7422	*	
TOTAL PHENOLICS (4AAP)	not analyzed		
CYANIDE	0.9036	*	0.9036
VOLATILE ORGANICS			0.0251
Chloroform	0.0251		
EXTRACTABLE ORGANICS			
not analyzed			
OC PESTICIDES			
none detected			

TOTAL LOADING	28.2381

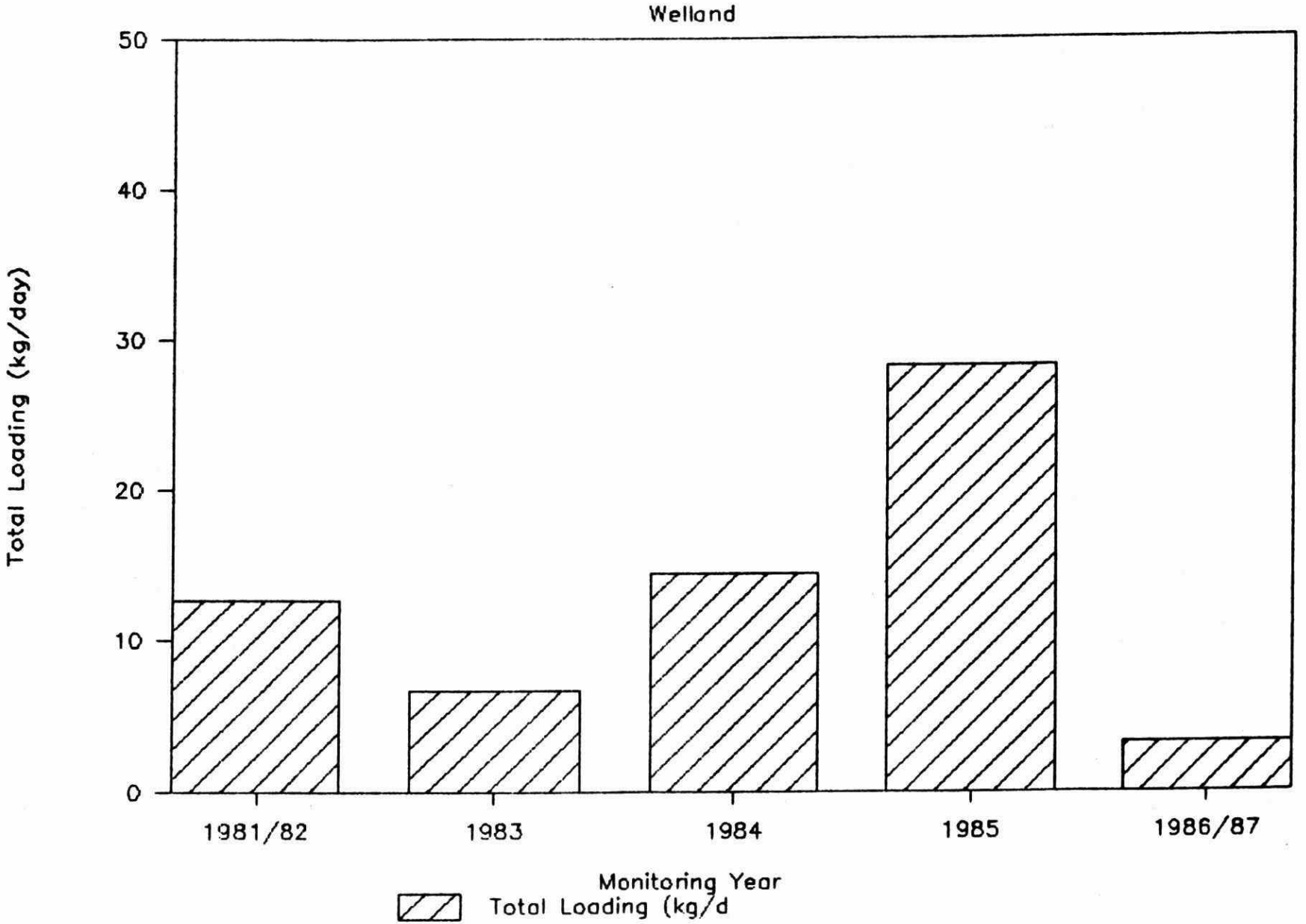
NOTE: * denotes values above cut-off limits

TABLE 10
CYANAMID OF CANADA LTD. WELLAND PLANT
PRIORITY POLLUTANT LOADINGS
1986/1987 Niagara River Improvement Team Survey
Flow = 27275 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			1.7538
Copper	0.0382		
Lead	0.3900		
Zinc	1.3256	*	
TOTAL PHENOLICS (4AAP)	0.0764		0.0764
CYANIDE	1.2301	*	1.2301
VOLATILE ORGANICS			0.1418
Methylene Chloride	0.0409		
Chloroform	0.1004		
o-Xylene	0.0005		
EXTRACTABLE ORGANICS			
none detected			
OC PESTICIDES			0.000058
A-BHC	0.000004		
B-BHC	0.000055		
TOTAL LOADING			3.2021

NOTE: * denotes values above cut-off limits

Cyanamid of Canada Ltd. Welland Plant



JULY, 1987

CYANAMID OF CANADA LTD. NIAGARA FALLS PLANT

This facility was determined to exceed the NRTC cutoff levels for total organics, heavy metals and cyanide.

BACKGROUND:

Cyanamid of Canada Ltd. at its Niagara Falls facility manufactures calcium carbide, calcium cyanide, calcium cyanamide and liquid nitrogen.

The NRTC report identified this facility as discharging the following contaminants in excess of cutoff levels:

Benzylbutyl Phthalate	0.35 kg/day
di-iso-octyl Phthalate	0.35 kg/day
Zinc	0.60 kg/day
Cyanide	0.96 kg/day.

The processes at this facility do not involve process wastewater, only cooling water is discharged. Leakage to cooling water may occur due to the age of this facility.

STATUS:

The company has made process changes to eliminate zinc and to reduce contact of cyanide by cooling waters.

The company is required to monitor for cyanide on a monthly basis and to report the results to the IMIS system. The 1986 IMIS report on this facility indicates that the company was in compliance with all Provincial Effluent Guidelines for discharge.

Neither the Ministry of the Environment's Abatement Section nor the company can determine a source of the phthalates (plasticizers) found during the NRTC monitoring. Phthalates have not been detected at significant concentrations in this company's effluent since the NRTC monitoring.

TABLE 11
CYANAMID OF CANADA LTD. NIAGARA FALLS PLANT
PRIORITY POLLUTANT LOADINGS
1981/1982 Niagara River Toxics Committee Survey
Flow = 39300 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			0.7320
Arsenic	0.0200		
Copper	0.1125		
Mercury	0.00049		
Zinc	0.5990	*	
TOTAL PHENOLICS (4AAP)	not detected		
CYANIDE	0.9580	*	0.9580
VOLATILE ORGANICS			0.0446
Bromodichloromethane	0.0005		
Chloroform	0.0057		
Dibromochloromethane	0.0003		
Methylene Chloride	0.0344		
Toluene	0.0022		
1,1,1 Trichloroethane	0.0015		
EXTRACTABLE ORGANICS			0.6930
Butylbenzyl Phthalate	0.3465		
di-iso-octyl Phthalate	0.3465		
OC PESTICIDES			0.002850
A-BHC	0.002650		
G-BHC	0.000200		

TOTAL LOADING 2.4304

NOTE: * denotes values above cut-off limits

TABLE 12
CYANAMID OF CANADA LTD. NIAGARA FALLS PLANT
PRIORITY POLLUTANT LOADINGS
1983 Niagara River Improvement Team Survey
Flow =32400 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			4.3806
Cadmium	0.0540		
Chromium	0.7560	*	
Mercury	0.00659		
Lead	1.2960	*	
Zinc	2.2680	*	
TOTAL PHENOLICS (4AAP)	0.0821		0.0821
CYANIDE	4.6440	*	4.6440
VOLATILE ORGANICS			
none detected			
EXTRACTABLE ORGANICS			
none detected			
OC PESTICIDES & PBC's			0.000108
A-BHC	0.000108		

TOTAL LOADING 9.1068

NOTE: * denotes values above cut-off limits

TABLE 13
CYANAMID OF CANADA LTD. NIAGARA FALLS PLANT
PRIORITY POLLUTANT LOADINGS
1984 Niagara River Improvement Team Survey
Flow = 32400 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			1.6209
Copper	0.4320		
Mercury	0.00086		
Zinc	1.1880	*	
TOTAL PHENOLICS (4AAP)	not detected		
CYANIDE	0.1663		0.1663
VOLATILE ORGANICS			0.0150
1,2 dichloroethane	0.0147		
1,1,1 Trichloroethane	0.0004		
EXTRACTABLE ORGANICS			
none detected			
OC PESTICIDES			
none detected			

TOTAL LOADING 1.8022

NOTE: * denotes values above cut-off limits

TABLE 14
CYANAMID OF CANADA LTD. NIAGARA FALLS PLANT
PRIORITY POLLUTANT LOADINGS
1985 Niagara River Improvement Team Survey
Flow = 32400 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			2.1600
Copper	0.2873		
Zinc	1.8727	*	
TOTAL PHENOLICS (4AAP)	not analyzed		
CYANIDE	0.2052		0.2052
VOLATILE ORGANICS			
not analyzed			
EXTRACTABLE ORGANICS			
not analyzed			
OC PESTICIDES			
not analyzed			
TOTAL LOADING			2.3652

NOTE: * denotes values above cut-off limits

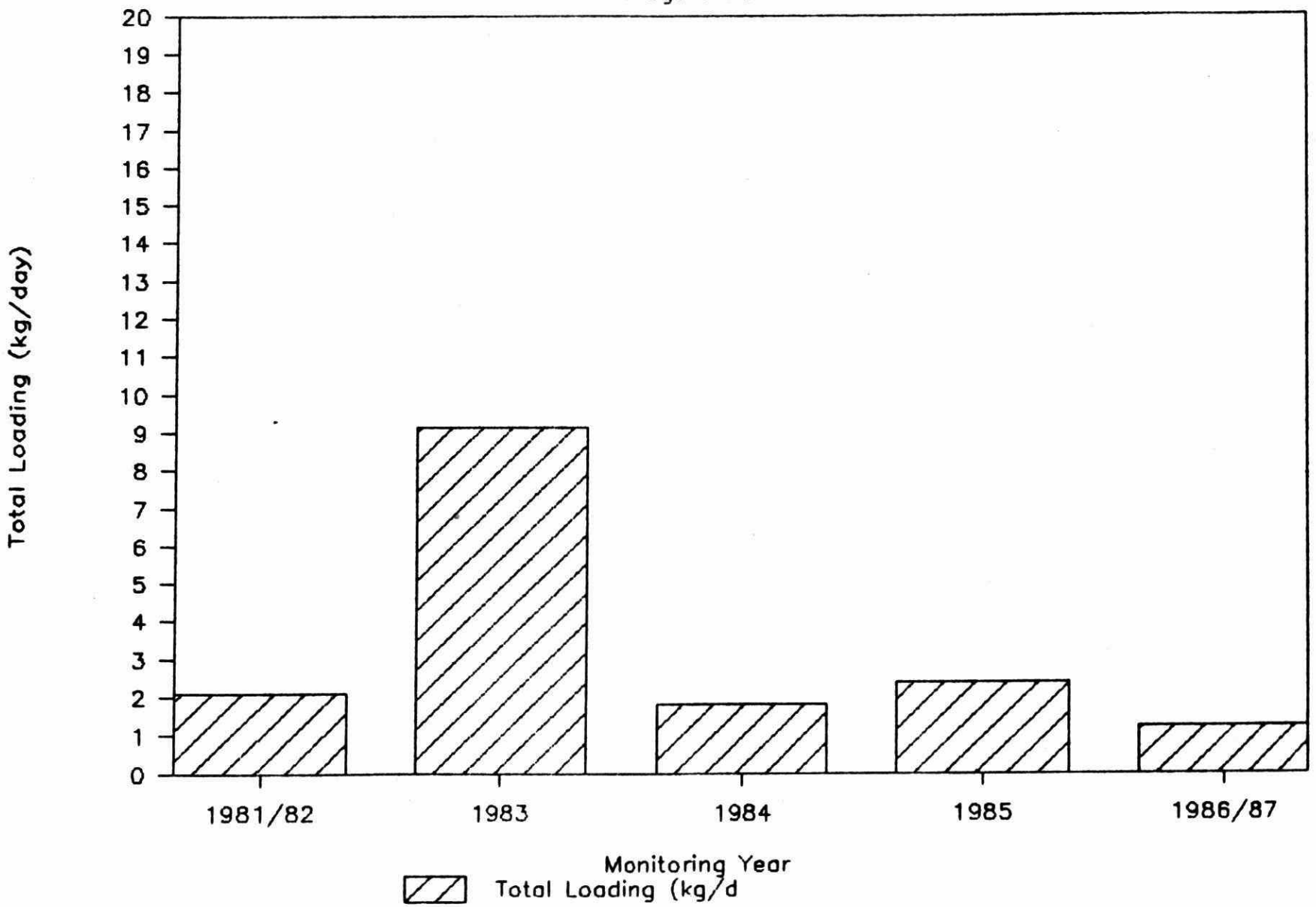
TABLE 15
CYANAMID OF CANADA LTD. NIAGARA FALLS PLANT
PRIORITY POLLUTANT LOADINGS
1986/1987 Niagara River Improvement Team Survey
Flow = 32400 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			0.3696
Silver	0.0302		
Chromium	0.1642		
Copper	0.0389		
Mercury	0.00025		
Antimony	0.0151		
Zinc	0.1210		
TOTAL PHENOLICS (4AAP)	0.0108		0.0108
CYANIDE	0.7603	*	0.7603
VOLATILE ORGANICS			0.0107
Methylene Chloride	0.0011		
Chloroform	0.0022		
Carbon Tetrachloride	0.0028		
1,1,1 Trichloroethane	0.0004		
Trichloroethylene	0.0004		
Tetrachloroethylene	0.0022		
Benzene	0.0011		
1,3 dichlorobenzene	0.0007		
EXTRACTABLE ORGANICS			0.0924
di-n-octyl Phthalate	0.0901		
Fluoranthene	0.0008		
Pyrene	0.0014		
OC PESTICIDES			
none detected			
TOTAL LOADING			1.2438

NOTE: * denotes values above cut-off limits

Cyanamid of Canada Ltd. Niagara Plant

Niagara Falls



JULY, 1987

FLEET MANUFACTURING

Effluent from this plant exceeded the NRTC cutoff levels for heavy metals.

BACKGROUND:

Fleet Manufacturing produces various airplane and sonar components.

At the time of the NRTC report, the discharge from this facility contained 1.08 kg/day of chromium at a reported flow rate of 910 m3/day.

A plant expansion in 1981 included a physical chemical wastewater facility for treatment of metal preparation acid solutions.

Two individual plant effluents discharge to Frenchman's Creek. One discharge was from the wastewater treatment plant, while the other contains several streams which include process wastewaters, pre-treated sanitary effluent, water from spray painting booths, non-contact cooling water, and roof drains and plant site runoff water.

A 1982 MOE Abatement survey resulted in relocation of the old metal preparation area closer to the existing effluent treatment facility.

STATUS:

Over the past four years, Fleet has undergone rapid expansion to approximately double its size since the time of the NRTC studies.

A voluntary program to treat effluent sources in an expanded treatment facility has been implemented. The doubling of production did not have an adverse effect on discharge of contaminants to the environment.

Late in 1986, Fleet Manufacturing connected all process wastewater discharges to the Regional Municipality of Niagara sewers for treatment at the Anger Avenue WPCP. Non-contact cooling water, roof drains and plant site runoff are still being discharged to Frenchman's Creek.

Monitoring subsequent to the Fleet connection to the Regional sewers indicated that organic degreasers remain in the discharges

entering Frenchman's Creek. Additional monitoring will further ascertain what level of contamination exists in these discharges.

Fleet Manufacturing has been notified of the contamination found in the discharges. Presently, the company will re-investigate the sewer separations which have taken place and will determine where the contamination of the cooling water is originating. The contaminated sources will then be rerouted to discharge into the Regional sewer system.

Due to the connection of process wastewater to Regional sewers, this industry is no longer considered a source which discharges contaminants at levels which are higher then the NRTC cutoff levels.

The results of industrial self monitoring from the IMIS program indicates that Fleet Manufacturing was not in compliance with Provincial effluent discharge guidelines for conventional parameters. Specifically, the effluent did not meet the requirements for BOD levels on monthly occasions but was in compliance on an annual basis.

TABLE 16
FLEET MANUFACTURING
PRIORITY POLLUTANT LOADINGS
1986/1987 Niagara River Improvement Team Survey
Flow = 910 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			1.1982
Cadmium	0.0028		
Chromium	1.0785	*	
Copper	0.0203		
Lead	0.0317		
Nickel	0.0014		
Zinc	0.0635		
TOTAL PHENOLICS (4AAP)	not detected		
CYANIDE	not detected		
VOLATILE ORGANICS			0.0543
Bromodichloromethane	0.0044		
Bromoform	0.0001		
Chloroform	0.0019		
Dibromochloromethane	0.0006		
1,1 Dichloroethane	0.0002		
1,2 Dichloroethane	0.0001		
1,1 Dichloroethylene	0.0007		
trans 1,2 dichloroethylene	0.0109		
Methylene Chloride	0.0001		
1,1,2,2 Tetrachloroethane	0.0045		
Toluene	0.0002		
1,1,1 Trichloroethane	0.0081		
1,1,2 Trichloroethane	0.0010		
Trichloroethylene	0.0215		
EXTRACTABLE ORGANICS			0.0205
Naphthalene	0.0005		
Dichlorobenzene	0.0200		
OC PESTICIDES & PCB's			0.000002
A-BHC	0.000002		
TOTAL LOADING			1.2730

NOTE: * denotes values above cut-off limits

TABLE 17
FLEET MANUFACTURING
PRIORITY POLLUTANT LOADINGS
1983 Niagara River Improvement Team Survey
Flow = 650 m3/day

PARAMETER	LOADING (kg/day)	TOTAL LOADING (kg/day)
METALS		0.4164
Cadmium	0.0133	
Chromium	0.3510	
Copper	0.0130	
Mercury	0.00003	
Lead	0.0163	
Zinc	0.0228	
TOTAL PHENOLICS (4AAP)	0.0892	0.0892
CYANIDE	0.0098	0.0098
VOLATILE ORGANICS		0.0140
1,1,1 Trichloroethane	0.0026	
Trichloroethylene	0.0091	
Tetrachloroethylene	0.0023	
EXTRACTABLE ORGANICS		0.0036
bis (2-ethylhexyl) Phthalate	0.0036	
OC PESTICIDES		
none detected		
TOTAL LOADING		0.5328

NOTE: * denotes values above cut-off limits

TABLE 18
FLEET MANUFACTURING
PRIORITY POLLUTANT LOADINGS
1984 Niagara River Improvement Team Survey
Flow = 1000 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			0.8058
Cadmium	0.0143		
Chromium	0.7389	*	
Copper	0.0035		
Mercury	0.00018		
Lead	0.0174		
Zinc	0.0316		
TOTAL PHENOLICS (4AAP)	0.0269		0.0269
CYANIDE	0.0041		0.0041
VOLATILE ORGANICS			0.0638
methylene chloride	0.0218		
Trichlorofluoromethane	0.0001		
1,1 dichloroethane	0.0002		
1,1,1 Trichloroethane	0.0017		
Chloroethylene	0.0007		
1,1 dichloroethylene	0.0011		
cis 1,2 dichloroethylene	0.0110		
Trichloroethylene	0.0251		
Tetrachloroethylene	0.0003		
Benzene	0.0002		
Chlorobenzene	0.00002		
1,2 dichlorobenzene	0.0011		
Toluene	0.0005		
o-Xylene	0.00002		
m-Xylene	0.00002		
EXTRACTABLE ORGANICS			0.0075
dimethyl Phthalate	0.0068		
diethyl Phthalate	0.0007		
OC PESTICIDES & PCB's			
PCB	0.000008		0.000008
TOTAL LOADING			0.9082

NOTE: * denotes values above cut-off limits

TABLE 19
FLEET MANUFACTURING
PRIORITY POLLUTANT LOADINGS
1985 Niagara River Improvement Team Survey
Flow = 1000 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			0.9483
Cadmium	0.0165		
Chromium	0.9120	*	
Copper	0.0033		
Mercury	0.00019		
Zinc	0.0163		
TOTAL PHENOLICS (4AAP)	0.0021		0.0021
CYANIDE	0.0036		0.0036
VOLATILE ORGANICS			0.3108
1,1,1 Trichloroethane	0.0042		
Trichloroethylene	0.3029	*	
Tetrachloroethylene	0.0017		
Toluene	0.0020		
EXTRACTABLE ORGANICS			
Not Analyzed			
OC PESTICIDES & PCB's			
none detected			
TOTAL LOADING			1.2647

NOTE: * denotes values above cut-off limits

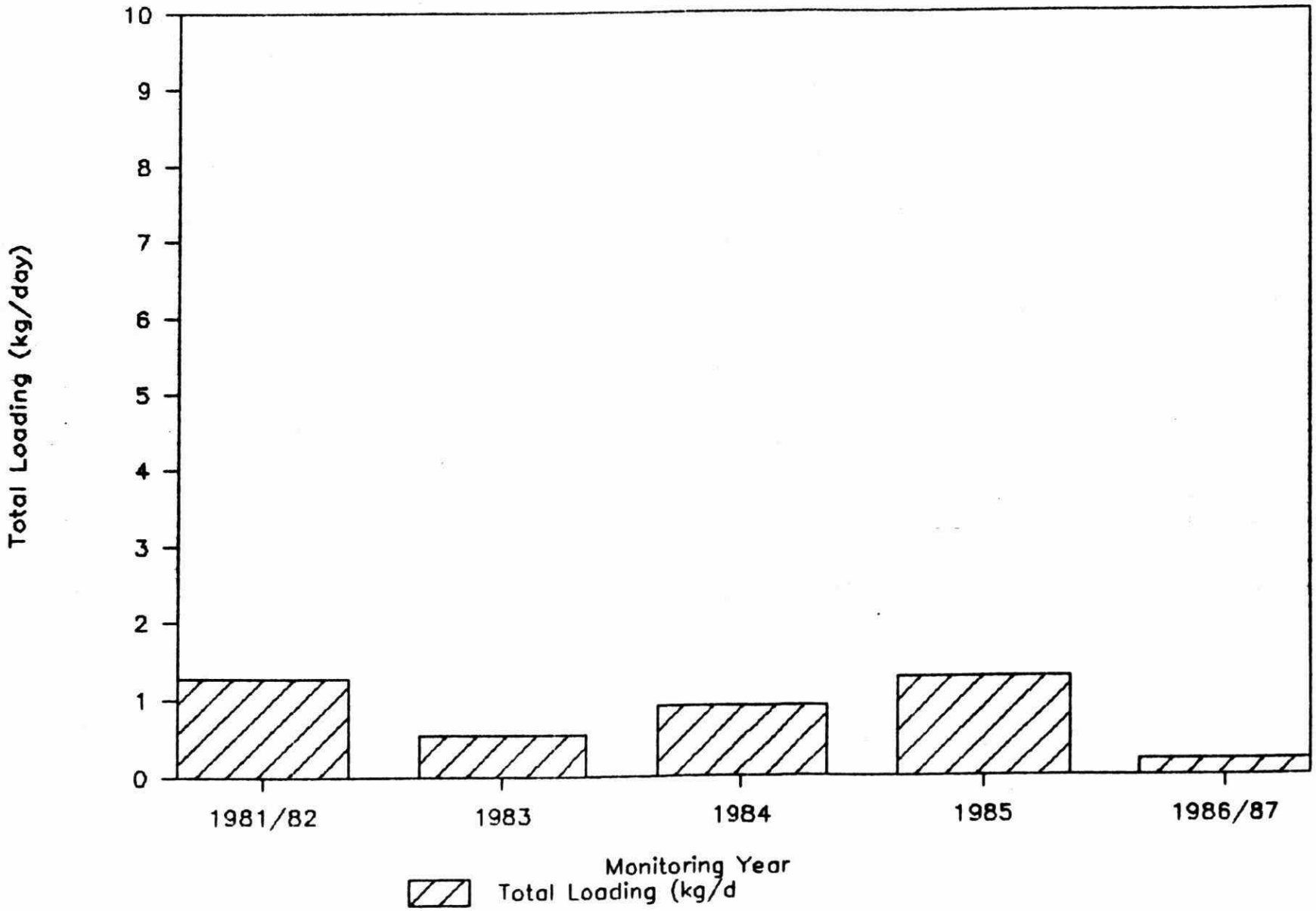
TABLE 20
FLEET MANUFACTURING
PRIORITY POLLUTANT LOADINGS
1986/1987 Niagara River Improvement Team Survey
Flow = 1000 m3/day

PARAMETER	LOADING (kg/day)	TOTAL LOADING (kg/day)
METALS		0.1048
Silver	0.0010	
Cadmium	0.0043	
Chromium	0.0778	
Mercury	0.00011	
Lead	0.0021	
Zinc	0.0194	
TOTAL PHENOLICS (4AAP)	0.0040	0.0040
CYANIDE	0.00004	0.00004
VOLATILE ORGANICS		0.0824
Methylene Chloride	0.0008	
Carbon Tetrachloride	0.0001	
1,1 dichlorethane	0.0001	
1,2 dichloroethane	0.0001	
1,1,1 Trichloroethane	0.0083	
1,1,2,2,Tetrachloroethane	0.0046	
1,1 dichloroethylene	0.0014	
trans 1,2 dichloroethylene	0.0025	
Trichloroethylene	0.0634	
Tetrachloroethylene	0.0004	
1,2 dichloropropane	0.0003	
Benzene	0.0001	
Ethylbenzene	0.00001	
Toluene	0.0001	
o-Xylene	0.0002	
EXTRACTABLE ORGANICS		0.0088
Benzlbutyl Phthalate	0.0002	
di-n-octyl Phthalate	0.0086	
OC PESTICIDES & PCB's		0.000004
A-BHC	0.000001	
B-BHC	0.000001	
Dieldrin	0.000002	
Endosulphan	0.000001	
TOTAL LOADING		0.2000

NOTE: * denotes values above cut-off limits

Fleet Manufacturing

Fort Erie



JULY, 1987

NIAGARA FALLS (STAMFORD) WATER POLLUTION CONTROL PLANT

The Niagara Falls (Stamford) Water Pollution Control Plant was determined to be in excess of the NRTC cutoff levels for total organics, heavy metals and cyanide.

BACKGROUND:

This plant was a primary plant with phosphorus removal with a design flow of 58200 m3/day (12.8 MGD) during the time of the 1981/1982 NRTC monitoring surveys.

At the time of the NRTC report, this plant was identified as a source of total organics (6.1 kg/day), heavy metals (16.4 kg/day) and cyanide (0.34 kg/day) at a daily flow of 45700 m3/day.

Other EPA priority pollutants were detected at below NRTC cutoff levels and were not included in these effluent loadings.

Effluent is discharged to the Niagara River via the Queenston-Chippawa Power Canal.

STATUS:

This plant has bee upgraded to a secondary treatment facility through the addition of a 68200 m3/day secondary treatment process (rotating biological contactors) in August 1985.

Since installation of the RBC process, the following reductions in conventional pollutants over 1981/1982 levels has been recorded: BOD5 60%, Suspended Solids 61%, Total Phosphorus 76% and Ammonia 39%,

The Region of Niagara has established an industrial pre-treatment strategy for the City of Niagara Falls for implementation by 1990.

Ministry monitoring carried late in 1986 has ascertained that the impact of the secondary treatment process has reduced the quantity of priority pollutants in the effluent and therefore the loading of these pollutants to the Niagara River.

TABLE 21
NIAGARA FALLS (STAMFORD) WPCP
PRIORITY POLLUTANT LOADINGS
1981/1982 Niagara River Toxics Committee Survey
Flow = 54625 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			17.1182
Cadmium	0.0460		
Chromium	3.6000	*	
Copper	0.9200	*	
Lead	0.5700	*	
Mercury	0.00220		
Nickel	0.3300		
Thallium	0.3500		
Zinc	11.3000	*	
TOTAL PHENOLICS (4AAP)	0.8700	*	0.8700
CYANIDE	0.3400	*	0.3400
VOLATILE ORGANICS			1.0731
Benzene	0.0770		
Chlorobenzene	0.0015		
Chlorform	0.1100		
1,1 Dichloroethane	0.0025		
1,2 Dichloroethane	0.0580		
trans 1,2 Dichloroethylene	0.0600		
Ethylbenzene	0.0042		
Methylene Chloride	0.4000	*	
1,1,2,2 Tetrachloroethane	0.0180		
Tetrachloroethylene	0.0440		
Toluene	0.1800		
1,1,1 Trichloroethane	0.1100		
Trichloroethylene	0.0079		
EXTRACTABLE ORGANICS			4.9766
2,4 Dichlorophenol	0.3900	*	
2,4 Dimethylphenol	0.0140		
Acenaphthelene	0.0046		
Naphthalene	0.0780		
di-n-butyl Phthalate	3.4000	*	
diethyl Phthalate	0.7900	*	
bis (2-ethylhexyl) Phthalate	0.3000	*	
OC PESTICIDES & PCB's			0.017308
Aldrin	0.000300		
A-BHC	0.001300		
B-BHC	0.002000		
G-BHC	0.000500		
D-BHC	0.000360		
p,p'-DDD	0.000020		
p,p'-DDT	0.003000		
Endosulphan I	0.000700		
Endosulphan II	0.000780		
Endosulphan Sulphate	0.000080		
Endrin	0.000060		
Heptachlor	0.008200		
p,p'-DDE	0.000008		
TOTAL LOADING			24.3952

NOTE: * denotes values above cut-off limits

TABLE 22
NIAGARA FALLS (STAMFORD) WPCP
PRIORITY POLLUTANT LOADINGS
1982 Niagara River Improvement Team Survey
Flow =61270 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			5.3207
Cadmium	0.0490		
Chromium	0.4902	*	
Copper	2.2670	*	
Mercury	0.00245		
Nickel	0.3064		
Zinc	2.2057	*	
TOTAL PHENOLICS (4AAP)	2.1812	*	2.1812
CYANIDE	0.0061		0.0061
VOLATILE ORGANICS			1.4092
Chloroform	0.7965	*	
Tetrachloroethylene	0.6127	*	
EXTRACTABLE ORGANICS			4.1051
diethyl Phthalate	1.1029	*	
dibutyl Phthalate	0.3064	*	
bisoctyl Phthalate	2.0832	*	
benzylbutyl Phthalate	0.1225		
phenol	0.4902	*	
OC PESTICIDES & PBC's			0.000123
G-BHC	0.000123		

TOTAL LOADING 13.0224
NOTE: * denotes values above cut-off limits

TABLE 23
NIAGARA FALLS (STAMFORD) WPCP
PRIORITY POLLUTANT LOADINGS
1984 Niagara River Improvement Team Survey
Flow = 56150 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			3.5391
Copper	1.8530	*	
Mercury	0.00168		
Zinc	1.6845	*	
TOTAL PHENOLICS (4AAP)	0.8271	*	0.8271
CYANIDE	1.4521	*	1.4521
VOLATILE ORGANICS			9.5792
Methylene Chloride	8.7033	*	
Chloroform	0.3257	*	
1,1,1 Trichloroethane	0.0112		
1,1 Dichloroethylene	0.2246	*	
Tetrachloroethylene	0.0038		
Benzene	0.0038		
Chlorobenzene	0.0019		
1,2 dichlorobenzene	0.1516		
1,3 dichlorobenzene	0.0955		
1,4 dichlorobenzene	0.0168		
Ethylbenzene	0.0019		
Toluene	0.0225		
o-Xylene	0.0056		
m-Xylene	0.0056		
p-Xylene	0.0056		
EXTRACTABLE ORGANICS			0.8310
diethyl Phthalate	0.0618		
dibutyl Phthalate	0.5896		
bis (2-ethylhexyl) Phthalate	0.0618		
Anthracene	0.0562		
Phenol	0.0618		
OC PESTICIDES			0.005465
A-BHC	0.000112		
G-BHC	0.000674		
Methoxychlor	0.001853		
Endosulfan I	0.000112		
Endosulfan II	0.000168		
Oxy-Chlordane	0.000056		
p,p'-DDD	0.000337		
p,p'-DDT	0.000056		
Hexachlorobenzene	0.000019		
PCB	0.002078		
TOTAL LOADING			16.2341

NOTE: * denotes values above cut-off limits

TABLE 24
NIAGARA FALLS (STAMFORD) WPCP
PRIORITY POLLUTANT LOADINGS
1985 Niagara River Improvement Team Survey
Flow = 57060 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			7.9918
Copper	3.2353	*	
Mercury	0.00342		
Zinc	4.7531	*	
TOTAL PHENOLICS (4AAP)	not analyzed		
CYANIDE	not detected		
VOLATILE ORGANICS			1.2553
Chloroform	0.4565	*	
Chlorodibromomethane	0.0571		
Dichlorobromomethane	0.1141		
Tetrachloroethylene	0.1141		
1,3 dichlorobenzene	0.2853	*	
Toluene	0.1712		
m-Xylene	0.0571		
EXTRACTABLE ORGANICS			
not analyzed			
OC PESTICIDES			0.000456
A-BHC	0.000456		

TOTAL LOADING	9.2476

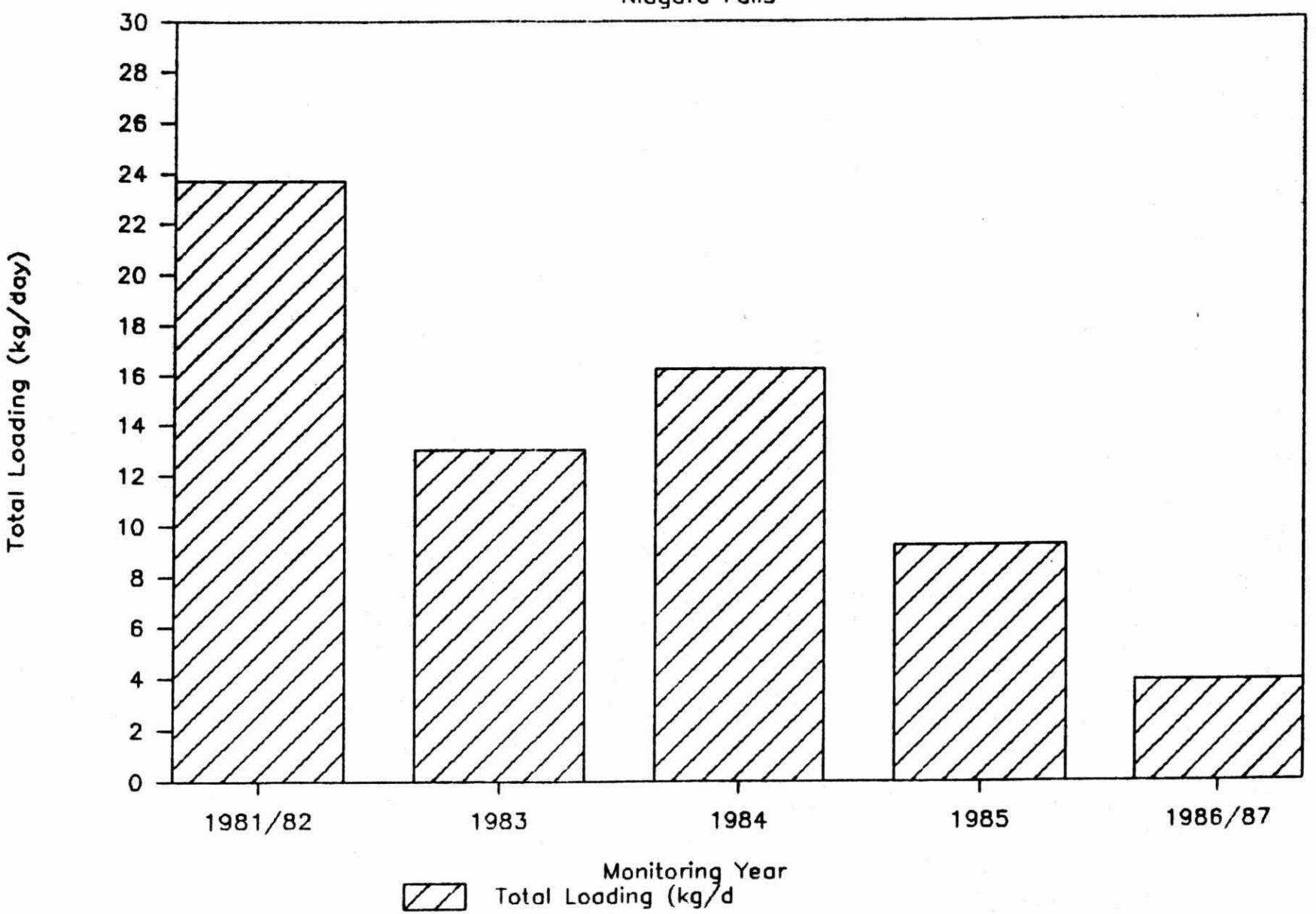
NOTE: * denotes values above cut-off limits

TABLE 25
NIAGARA FALLS (STAMFORD) WPCP
PRIORITY POLLUTANT LOADINGS
1986/1987 Niagara River Improvement Team Survey
Flow = 56675 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			2.3931
Cadmium	0.1247		
Copper	0.3797		
Mercury	0.00145		
Nickel	0.5044	*	
Zinc	1.3829	*	
TOTAL PHENOLICS (4AAP)	0.2947	*	0.2947
CYANIDE	0.2154		0.2154
VOLATILE ORGANICS			0.5327
Methylene Chloride	0.1814		
Chloroform	0.1077		
Tetrachloroethylene	0.0510		
Benzene	0.0113		
1,2 dichlorobenzene	0.0283		
1,3 dichlorobenzene	0.0567		
1,4 dichlorobenzene	0.0623		
Toluene	0.0283		
o-Xylene	0.0057		
EXTRACTABLE ORGANICS			0.4609
bis (2-ethylhexyl) Phthalate	0.4364	*	
Naphthalene	0.0113		
Fluoranthene	0.0019		
Phenanthrene	0.0057		
Pyrene	0.0057		
OC PESTICIDES & PCB's			0.003213
G-BHC	0.001785		
Dieldrin	0.000034		
Endosulfan Sulphate	0.000034		
Hexachlorobenzene	0.000028		
PCB	0.001332		
TOTAL LOADING			3.9001

NOTE: * denotes values above cut-off limits

Niagara Falls (Stamford) WPCP



JULY, 1987

WELLAND (RIVER ROAD) WATER POLLUTION CONTROL PLANT

The Welland (River Road) Water Pollution Control Plant exceeded the NRTC cutoff levels for heavy metals.

BACKGROUND:

This facility is a secondary (conventional activated sludge) treatment plant with phosphorus removal. This facility was constructed in 1972 with a rated capacity of 45500 m3/day (10 MGD).

At the time of the NRTC report, the Welland WPCP was identified as a source of heavy metals (17.1 kg/day). The predominant contaminant at that time was lead at 13 kg/day. The average daily flow at that time was 30040 m3/day (6.6 MGD).

This plant discharges effluent to the Niagara River via the Welland River and the Queenston-Chippawa Power Canal.

In 1983, an expansion of the secondary clarification section and the addition of a second chlorine contact chamber at this plant expanded the secondary treatment section to a rated capacity of 69160 m3/day (15.2 MGD).

STATUS:

An application by the Regional Municipality of Niagara to re-rate the entire plant to 69160 m3/day was turned down and the Region has commissioned a full scale study of plant expansion.

An application has been resubmitted to the Ministry for an expansion to 69160 m3/day with provision for nitrification. The application is under review.

The Ministry and the Region will continue routine inspections and monitoring.

Following the NRTC report, lead levels decreased and have remained below NRTC cutoff levels.

A consultant for Environment Canada and the Ministry of the Environment has conducted an extensive nine day study to ascertain organic and heavy metal removals across the plant. This data when released will complement the Ministry's 1986 Niagara River point source sampling program.

A survey by the Welland District Office Abatement staff under

Section 126 of the Environmental Protection Act is currently in preparation reviewing the operational practices and performance of the Welland WPCP.

TABLE 26
WELLAND (RIVER ROAD) WPCP
PRIORITY POLLUTANT LOADINGS
1981/1982 Niagara River Toxics Committee Survey
Flow = 26500 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			16.4941
Arsenic	0.2200		
Cadmium	0.1100		
Chromium	0.4100		
Copper	0.7000	*	
Lead	13.0000	*	
Mercury	0.00410		
Nickel	0.3500		
Zinc	1.70000	*	
TOTAL PHENOLICS (4AAP)	0.1600		0.1600
CYANIDE	0.1600		0.1600
VOLATILE ORGANICS			0.3131
1,2 Dichlorobenzene	0.0180		
1,4 Dichlorobenzene	0.0180		
Benzene	0.0310		
Bromodichloromethane	0.0011		
Carbon Tetrachloride	0.0140		
Chloroform	0.0310		
1,1 Dichloroethane	0.0018		
Methylene Chloride	0.0490		
1,1,2,2 Tetrachloroethane	0.0017		
Tetrachloroethylene	0.0390		
Toluene	0.0970		
1,1,1 Trichlorethane	0.0051		
Trichlorethylene	0.0064		
EXTRACTABLE ORGANICS			0.2370
dibutyl Phthalate	0.0670		
diethyl Phthalate	0.0230		
di-n-octyl Phthalate	0.0180		
bis (2-ethylhexyl) Phthalate	0.0210		
Phenol	0.0410		
Acenaphthene	0.0410		
Naphthalene	0.0130		
Phenanthrene	0.0130		
OC PESTICIDES			0.016586
A-BHC	0.000890		
B-BHC	0.000270		
G-BHC	0.000720		
Chlordane	0.006000		
p,p'-DDT	0.002300		
Endosulphan I	0.000200		
Endosulphan II	0.000340		
Endosulphan Sulphate	0.000034		
Dieldrin	0.000032		
PCB	0.005800		
TOTAL LOADING			17.3808

NOTE: * denotes values above cut-off limits

TABLE 27
WELLAND (RIVER ROAD) WPCP
PRIORITY POLLUTANT LOADINGS
1983 Niagara River Improvement Team Survey
Flow =48780 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			3.5512
Arsenic	0.0488		
Cadmium	0.0390		
Chromium	0.1463		
Copper	0.8780	*	
Nickel	0.3415		
Lead	0.5854	*	
Zinc	1.5122	*	
TOTAL PHENOLICS (4AAP)	0.1854		0.1854
CYANIDE	0.0005		0.0005
VOLATILE ORGANICS			1.51218
Methylene Chloride	1.4634	*	
Trichloroethylene	0.0488		
EXTRACTABLE ORGANICS			0.87804
dibutyl Phthalate	0.0488		
diisooctyl Phthalate	0.8293	*	
OC PESTICIDES & PBC's			0.001317
A-BHC	0.000146		
B-BHC	0.001122		
Hexachlorobenzene	0.000049		

TOTAL LOADING 6.1286

NOTE: * denotes values above cut-off limits

TABLE 28
WELLAND (RIVER ROAD) WPCP
PRIORITY POLLUTANT LOADINGS
1984 Niagara River Improvement Team Survey
Flow = 40240 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			0.1332
Mercury	0.00040		
Zinc	0.1328		
TOTAL PHENOLICS (4AAP)	0.2133		0.2133
CYANIDE	0.1086		0.1086
VOLATILE ORGANICS			1.0032
Methylene Chloride	0.8048	*	
Chloroform	0.1408		
Benzene	0.0012		
1,3 dichlorobenzene	0.0523		
Toluene	0.0040		
EXTRACTABLE ORGANICS			0.0423
dibutyl Phthalate	0.0423		
OC PESTICIDES & PCB's			0.000752
A-BHC	0.000080		
G-BHC	0.000672		
TOTAL LOADING			1.5013

NOTE: * denotes values above cut-off limits

TABLE 29
WELLAND (RIVER ROAD) WPCP
PRIORITY POLLUTANT LOADINGS
1985 Niagara River Improvement Team Survey
Flow = 35840 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			2.8695
Chromium	0.1792		
Copper	1.0752	*	
Mercury	0.00233		
Nickel	0.3584		
Zinc	1.2544	*	
TOTAL PHENOLICS (4AAP)	not analyzed		
CYANIDE	0.1075		0.1075
VOLATILE ORGANICS			
not analyzed			
EXTRACTABLE ORGANICS			
not analyzed			
OC PESTICIDES			0.000430
G-BHC	0.000430		

TOTAL LOADING 2.9775

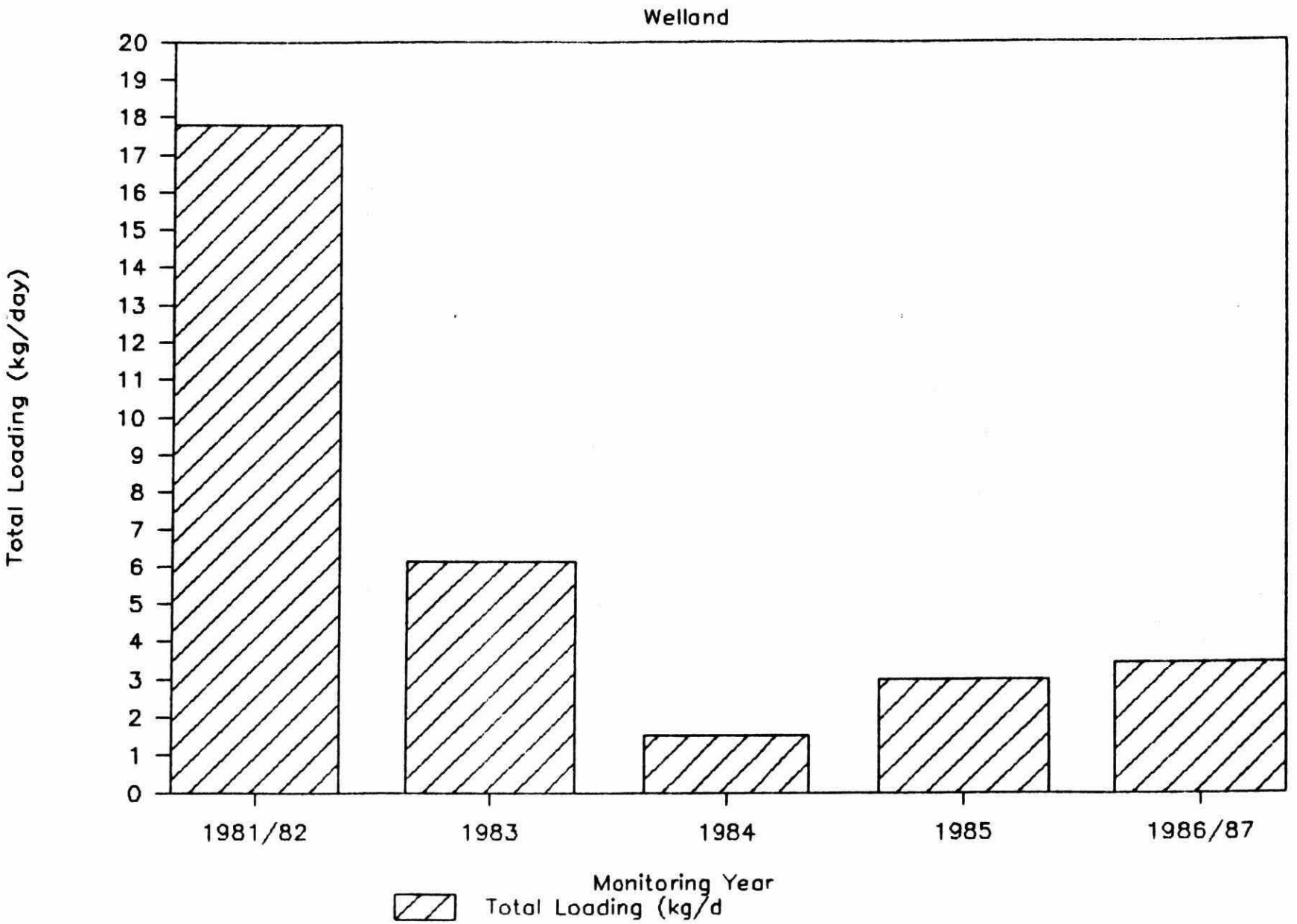
NOTE: * denotes values above cut-off limits

TABLE 30
WELLAND (RIVER ROAD) WPCP
PRIORITY POLLUTANT LOADINGS
1986/1987 Niagara River Improvement Team Survey
Flow = 39500 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day
METALS			2.2205
Cadmium	0.0632		
Chromium	0.1738		
Copper	0.2963		
Mercury	0.00099		
Lead	0.3950		
Antimony	0.2805		
Zinc	1.0112	*	
TOTAL PHENOLICS (4AAP)	0.1541		0.1541
CYANIDE	0.1264		0.1264
VOLATILE ORGANICS			0.2880
Methylene Chloride	0.1422		
Chloroform	0.0316		
Carbon Tetrachloride	0.0040		
Chlorodibromomethane	0.0004		
Dichlorobromomethane	0.0040		
1,1,1 Trichloroethane	0.0012		
Tetrachloroethylene	0.0040		
Benzene	0.0016		
1,2 dichlorobenzene	0.0972		
Toluene	0.0016		
o-Xylene	0.0004		
EXTRACTABLE ORGANICS			0.6479
dibutyl Phthalate	0.0107		
di-n-octyl Phthalate	0.6320	*	
Fluoranthene	0.0012		
OC PESTICIDES			0.002508
B-BHC	0.000079		
G-BHC	0.002370		
Endosulfan I	0.000040		
Hexachlorobenzene	0.000020		
TOTAL LOADING			3.4357

NOTE: * denotes values above cut-off limits

Welland (River Road) WPCP



JULY, 1987

TOWN OF FORT ERIE (ANGER AVE.) WATER POLLUTION CONTROL PLANT

The Anger Avenue Water Pollution Control Plant exceeded NRTC cutoff levels for total organics and heavy metals.

BACKGROUND:

This plant was constructed in 1964 as a 4500 m3/day (1 MGD) facility and was expanded in 1979 to 15015 m3/day (3.3 MGD).

The Anger Ave. WPCP provides primary treatment with phosphorus removal and chlorination.

Effluent from the treatment plant is discharged to the Niagara River via a submerged outfall.

At the time of the NRTC report, this facility was identified as a source of total organics (4.13 kg/day) and heavy metals (1.8 kg/day) at a daily average flow rate of 16000 m3/day.

STATUS:

The Regional Municipality of Niagara, which owns and operates the WPCP, plans to expand the plant to include full secondary treatment by 1990. A consultant was retained by the Region to conduct a feasibility study for the expansion of the plant capacity to include secondary treatment.

Negotiations are underway between the Region of Niagara, the Federal and Provincial governments for expansion of the plant to secondary treatment, separation of sewers to prevent hydraulic overloading and overflow to the Niagara River, as well as possible diversion of the Crystal Beach area to the Anger Avenue plant, leading to phase-out of the overloaded Crystal Beach WPCP.

An industrial pre-treatment program strategy for the Town of Fort Erie has been established by the Regional Municipality of Niagara for implementation by 1990.

Recently, two industries have connected their process effluents to Regional sewers and therefore to the Anger Avenue WPCP. Gould National Batteries, has connected a heavy metal (lead) bearing process wastewater and Fleet Manufacturing, has connected its process wastewater, which may contain organic degreasers, heavy metals (chromium) and possibly plasticizers (phthalates).

Monitoring during the summer of 1986 and winter of 1987 has shown considerable increases in diethyl phthalate concentrations in the plant effluent. The diethyl phthalate concentrations in the effluent of the Anger Avenue WPCP ranged from 2000 to 4000 ug/L. At these concentrations, contamination of the samples during sample collection is highly unlikely. The source of this contaminant has yet to be determined. Further monitoring has been undertaken at the treatment plant.

The Ministry of the Environment has arranged with the Region of Niagara to assist in a monitoring program which should identify the industrial discharges which are causing the high levels of dimethyl phthalate at the Anger Ave WPCP. Presently, a number of possible sources may exist within Fort Erie for this contaminant. When the Region determines the source of the contaminant efforts will be made to abate the discharge at point of origin.

TABLE 31
FORT ERIE (Anger Ave.) WPCP
PRIORITY POLLUTANT LOADINGS
1981/1982 Niagara River Toxics Committee Survey
Flow = 16100 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			1.9718
Beryllium	0.0380		
Cadmium	0.0210		
Chromium	0.0820		
Copper	0.4900	*	
Mercury	0.00080		
Nickel	0.0400		
Zinc	1.3000	*	
TOTAL PHENOLICS (4AAP)	0.2700	*	0.2700
CYANIDE	0.0980		0.0980
VOLATILE ORGANICS			2.7711
Benzene	0.0570		
Bromodichloromethane	0.0024		
Chlorobenzene	0.0002		
Chloroform	0.0960		
Dibromochloromethane	0.0003		
1,1 Dichloroethane	0.0002		
1,2 Dichloroethane	0.3200	*	
trans 1,2 Dichloroethylene	1.8000	*	
Ethylbenzene	0.0210		
Methylene Chloride	0.1600		
1,1,2,2 Tetrachloroethane	0.0110		
Tetrachloroethylene	0.0440		
Toluene	0.0470		
1,1,1 Trichloroethane	0.0620		
Trichlorethylene	0.1500		
EXTRACTABLE ORGANICS			2.3812
dimethyl Phthalate	0.7500	*	
diethyl Phthalate	0.1600		
dibutyl Phthalate	0.9900	*	
di-n-octyl Phthalate	0.1400		
bis (2-ethylhexyl) Phthalate	0.1000		
butylbenzl Phthalate	0.0810		
Naphthalene	0.0520		
Phenol	0.0120	*	
Acenaphthalene	0.0032		
1,2 Dichlorobenzene	0.0030		
OC PESTICIDES & PCB's			0.00467
A+B+G+D-BHC	0.000860		
Chlordane	0.000080		
p,p' DDD	0.000070		
p,p' DDT	0.002800		
Endosulphan I	0.000400		
Endosulphan II	0.000260		
Endrin	0.000030		
Endrin Aldehyde	0.000030		
Heptachlor	0.000120		
Dieldrin	0.000020		
TOTAL LOADING			7.4068

NOTE: * denotes values above cut-off limits

TABLE 32
FORT ERIE (Anger Ave.) WPCP
PRIORITY POLLUTANT LOADINGS
1987 Niagara River Improvement Team Survey
Flow = 14080 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			1.1605
Cadmium	0.0056		
Chromium	0.0563		
Copper	0.4224		
Mercury	0.00070		
Nickel	0.1408		
Lead	0.1126		
Zinc	0.4224		
TOTAL PHENOLICS (4AAP)	0.2450	*	0.2450
CYANIDE	not detected		
VOLATILE ORGANICS			2.3654
Chloroform	0.3802	*	
1,1,1 Trichloroethane	0.2253		
Tetrachloroethylene	1.1264	*	
Toluene	0.4928	*	
m-Xylene	0.1408		
EXTRACTABLE ORGANICS			3.2102
dimethyl Phthalate	2.9146	*	
diethyl Phthalate	0.2112		
dibutyl Phthalate	0.0422		
naphthalene	0.0282		
phenol	0.0141		
OC PESTICIDES & PCB's			0.001619
A-BHC	0.000028		
G-BHC	0.000084		
A-Chlordane	0.000493		
G-Chlordane	0.000662		
PCB	0.000352		

TOTAL LOADING 6.9832

NOTE: * denotes values above cut-off limits

TABLE 33
FORT ERIE (Anger Ave.) WPCP
PRIORITY POLLUTANT LOADINGS
1984 Niagara River Improvement Team Survey
Flow = 12875 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			0.3006
Chromium	0.0425		
Mercury	0.00064		
Lead	0.0863		
Zinc	0.1712		
TOTAL PHENOLICS (4AAP)	0.4429	*	0.4429
CYANIDE	0.1803		0.1803
VOLATILE ORGANICS			0.2642
Chloroform	0.0644		
Bromoform	0.0154		
Chlorodibromomethane	0.0026		
Dichlorobromomethane	0.0064		
1,2 dichloroethane	0.0013		
1,1,1 Trichloroethane	0.0103		
1,1,2 Trichloroethane	0.0052		
1,1 dichloroethylene	0.0112		
cis 1,2 dichloroethylene	0.0013		
Trichloroethylene	0.0017		
Tetrachloroethylene	0.0614		
Benzene	0.0039		
Chlorobenzene	0.0013		
1,2 dichlorobenzene	0.0670		
Ethylbenzene	0.0026		
Toluene	0.0167		
o-Xylene	0.0064		
m-Xylene	0.0052		
EXTRACTABLE ORGANICS			4.8868
dimethyl Phthalate	4.0724	*	
diethyl Phthalate	0.4072	*	
dibutyl Phthalate	0.4072	*	
OC PESTICIDES & PCB's			0.000708
A-BHC	0.000013		
G-BHC	0.000013		
A-Chlordane	0.000064		
G-Chlordane	0.000064		
Heptachlor	0.000013		
PCB	0.000541		
TOTAL LOADING			6.0955

NOTE: * denotes values above cut-off limits

TABLE 34
FORT ERIE (Anger Ave.) WPCP
PRIORITY POLLUTANT LOADINGS
1985 Niagara River Improvement Team Survey
Flow = 12960 m3/day

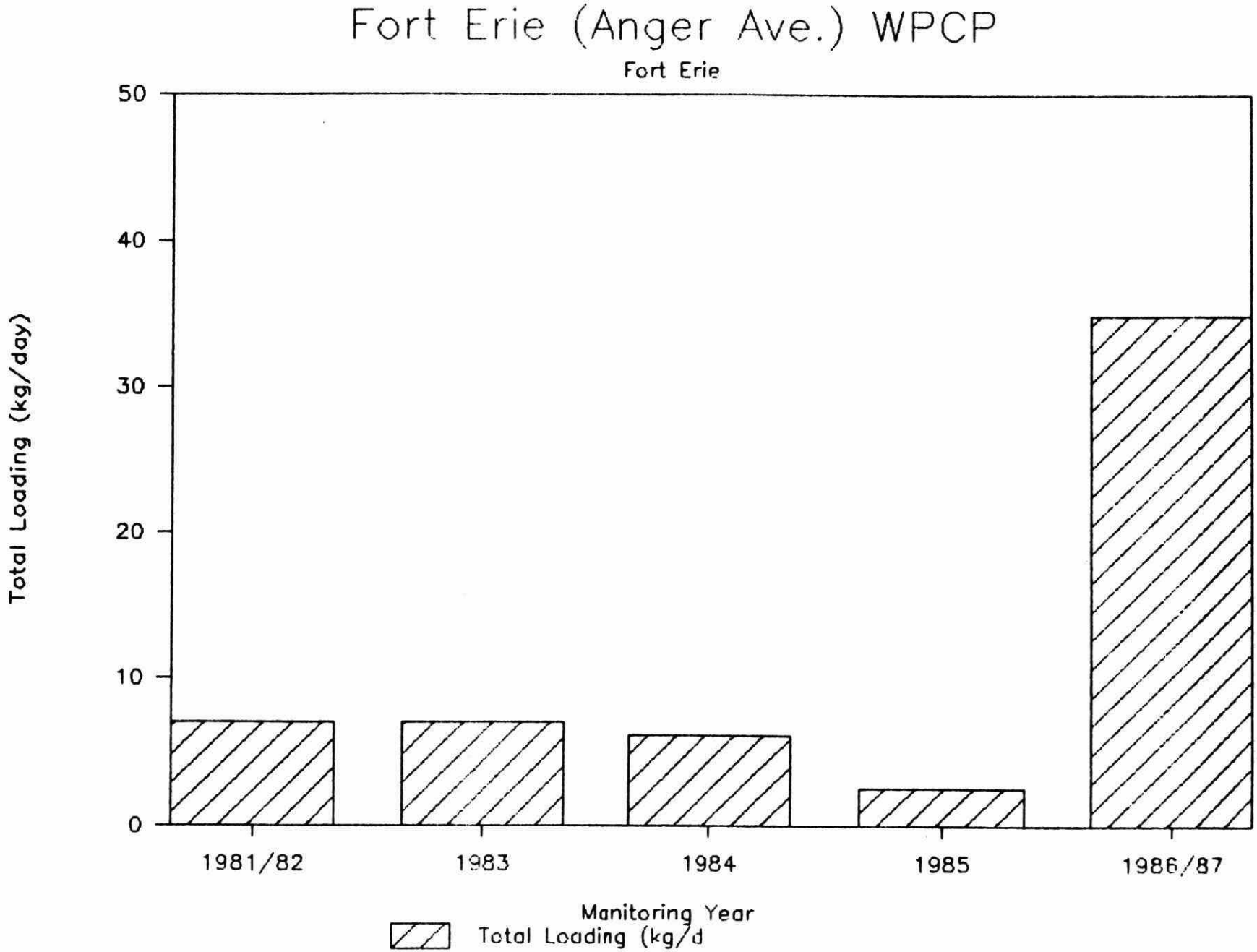
PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			1.4264
Cadmium	0.1296		
Copper	0.7776	*	
Mercury	0.00078		
Zinc	0.5184	*	
TOTAL PHENOLICS (4AAP)	N/A		
CYANIDE	0.1296		0.1296
VOLATILE ORGANICS			1.0109
Chloroform	0.5184	*	
Chlorodibromomethane	0.0130		
Dichlorobromomethane	0.0259		
1,1,1 Trichloroethane	0.0648		
Trichloroethylene	0.0389		
Tetrachloroethylene	0.1426		
1,2 dichlorobenzene	0.0518		
1,3 dichlorobenzene	0.1037		
Toluene	0.0259		
m-Xylene	0.0259		
EXTRACTABLE ORGANICS			
Not Analyzed			
OC PESTICIDES & PCB's			0.000492
G-BHC	0.000104		
A-Chlordane	0.000181		
G-Chlordane	0.000207		
TOTAL LOADING			2.5674

NOTE: * denotes values above cut-off limits

TABLE 35
FORT ERIE (Anger Ave.) WFCP
PRIORITY POLLUTANT LOADINGS
1986/1987 Niagara River Improvement Team Survey
Flow = 12875 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			1.1030
Chromium	0.0428		
Copper	0.2009		
Mercury	0.00060		
Lead	0.0863		
Thallium	0.3000		
Zinc	0.4725	*	
TOTAL PHENOLICS (4AAP)	0.3824	*	0.3824
CYANIDE	0.0901		0.0901
VOLATILE ORGANICS			1.6158
Methylene Chloride	1.1716	*	
Chloroform	0.0232		
Dichlorobromomethane	0.0142		
1,1,1 Trichloroethane	0.0399		
trans 1,2 dichloroethylene	0.0013		
Trichloroethylene	0.0077		
Tetrachloroethylene	0.2034		
Benzene	0.0425		
Chlorobenzene	0.0026		
1,2 dichlorobenzene	0.0567		
1,3 dichlorobenzene	0.0129		
Toluene	0.0373		
m-Xylene	0.0026		
EXTRACTABLE ORGANICS			21.6815
dimethyl Phthalate	21.1369	*	
diethyl Phthalate	0.0798		
dibutyl Phthalate	0.1185		
di-n-octyl Phthalate	0.0515		
bis (2-ethylhexyl) Phthalate	0.0258		
Naphthalene	0.0296		
Phenol	0.2395	*	
OC PESTICIDES & PCB's			0.001416
A-BHC	0.000052		
B-BHC	0.000090		
G-BHC	0.000760		
A-Chlordane	0.000129		
G-Chlordane	0.000155		
Dieldrin	0.000026		
Endosulphan I	0.000013		
Endrin	0.000052		
Heptachlor	0.000064		
Heptachlro Epoxide	0.000013		
Oxy-Chlordane	0.000013		
p,p' DDT	0.000026		
Hexachlorobenzene	0.000026		
TOTAL LOADING			34.8742

NOTE: * denotes values above cut-off limits


Fort Erie (Anger Ave.) WPCP
Fort Erie
Total Loading (kg/day)
50
40
30
20
10
0
1981/82
1983
1984
1985
1986/87
Monitoring Year
Total Loading (kg/d

JULY, 1987

McMASTER AVENUE COMBINED SEWER, CITY OF WELLAND

The McMaster Avenue Combined Sewer was identified by the NRTC to exceed cutoff levels of total organics and heavy metals.

BACKGROUND:

The McMaster Avenue Sewer is the only combined sewer remaining on the Ontario side of the Niagara River.

The City of Welland owns and maintains the sewer.

At the time of the NRTC report, this combined sewer was identified as a source of total organics (0.5 kg/day) and heavy metals (12.8 kg/day).

An estimated 9100 to 27300 m3/day (2 to 6 MGD) of untreated combined sewage discharged daily to the Welland River from this source, consisting mostly of industrial process water and cooling water.

A voluntary industrial sewer separation program was undertaken and is continuing.

STATUS:

The City of Welland has installed a separate sewer parallel to the McMaster Avenue sewer for diversion of uncontaminated cooling water streams.

Industries connected to the McMaster Avenue sewer are undertaking individual sewer separation programs at the Ministry's and City's request. Since the NRTC Report, one of the major industrial contributors to this sewer, Wabasso Cotton Mills, has ceased operations.

The Ministry has requested an abatement program for this source from the City of Welland.

The Ministry is surveying industries connected to this sewer to update effluent quality and quantity information as well as sampling the sewer outfall to the river.

Information gathered in these studies will support the Ministry in requiring the City of Welland to connect this sewer to the Welland (River Road) WPCP.

Currently, a survey report is being prepared under Section 126 of the Environmental Protection Act. From this report, a Provincial Control Order may be prepared to have the sewer connected to the local water pollution control facility.

TABLE 36
McMaster Avenue Combined Sewer
PRIORITY POLLUTANT LOADINGS
1981/1982 Niagara River Toxics Committee Survey
Flow = 27085 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			12.0800
Arsenic	0.2800		
Chromium	2.2000	*	
Copper	1.0000	*	
Lead	4.6000	*	
Nickel	3.6000	*	
Zinc	1.4000	*	
TOTAL PHENOLICS (4AAP)	0.0028		0.0028
CYANIDE	not detected		
VOLATILE ORGANICS			0.1148
Chloroform	0.0180		
1,2 Dichloroethane	0.0094		
trans 1,2 dichloroethylene	0.0230		
1,1,2,2 Tetrachloroethane	0.0140		
Toluene	0.0140		
Trichloroethylene	0.0270		
1,2 dichlorobenzene	0.0094		
EXTRACTABLE ORGANICS			0.5954
diethyl Phthalate	0.0570		
di-n-butyl Phthalate	0.2600	*	
bis (2-ethylhexyl) Phthalate	0.2700	*	
Acenaphthene	0.0042		
Acenaphthylene	0.0042		
OC PESTICIDES			0.024660
A-BHC	0.000230		
G-BHC	0.000200		
p,p'DDD	0.000030		
Endosulphan Sulphate	0.000030		
Heptachlor	0.000170		
Hexachlorobenzene	0.024000		
TOTAL LOADING			13.8177

NOTE: * denotes values above cut-off limits

TABLE 37
McMaster Avenue Combined Sewer
PRIORITY POLLUTANT LOADINGS
1983 Niagara River Improvement Team Survey
Flow =9100 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			2.1847
Chromium	0.1820		
Copper	0.2730		
Mercury	0.00073		
Lead	0.2730		
Nickel	0.2730		
Zinc	1.1830	*	
TOTAL PHENOLICS (4AAP)	0.0601		0.0601
CYANIDE	0.0091		0.0091
VOLATILE ORGANICS			
none detected			
EXTRACTABLE ORGANICS			
none detected			
OC PESTICIDES & PBC's			
not analyzed			
TOTAL LOADING			2.2539

NOTE: * denotes values above cut-off limits

TABLE 38
McMaster Avenue Combined Sewer
PRIORITY POLLUTANT LOADINGS
1984 Niagara River Improvement Team Survey
Flow =9100 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			2.9124
Chromium	0.1820		
Copper	0.0910		
Mercury	0.00036		
Zinc	2.6390	*	
TOTAL PHENOLICS (4AAP)	0.0728		0.0728
CYANIDE	not detected		
VOLATILE ORGANICS			0.2202
Chloroform	0.0464		
Bromoform	0.0146		
Chlorodibromomethane	0.0018		
Dichlorobromomethane	0.0055		
1,1,1 Trichloroethane	0.0036		
1,1 Dichloroethylene	0.0182		
cis 1,2 Dichloroethylene	0.0237		
Trichlroethylene	0.0118		
Tetrachlroethylene	0.0792		
1,2 Dichloropropane	0.0118		
Benzene	0.0009		
1,2 dichlorobenzene	0.0018		
Toluene	0.0009		
EXTRACTABLE ORGANICS			0.0583
diethyl Phthalate	0.0291		
Phenol	0.0291		
OC PESTICIDES & PCB's			0.000036
G-BHC	0.000036		
TOTAL LOADING			3.2637

NOTE: * denotes values above cut-off limits

TABLE **39**
McMaster Avenue Combined Sewer
PRIORITY POLLUTANT LOADINGS
1985 Niagara River Improvement Team Survey
Flow =9100 m³/day

PARAMETER	LOADING (kg/day)	TOTAL LOADING (kg/day)
METALS	not analyzed	
TOTAL PHENOLICS (4AAP)	not analyzed	
CYANIDE	not detected	
VOLATILE ORGANICS		0.3003
Chloroform	0.0546	
Chlorodibromomethane	0.0364	
Dichlorobromomethane	0.0273	
1,1,1 Trichloroethylene	0.0910	
Trichloroethylene	0.0182	
Tetrachloroethylene	0.0728	
EXTRACTABLE ORGANICS		
not analyzed		
OC PESTICIDES		
not analyzed		
TOTAL LOADING		0.3003

NOTE: * denotes values above cut-off limits

TABLE 40
McMaster Avenue Combined Sewer
PRIORITY POLLUTANT LOADINGS
1986/1987 Niagara River Improvement Team Survey
Flow = 5076 m3/day

PARAMETER	LOADING (kg/day)		TOTAL LOADING (kg/day)
METALS			1.1423
Silver	0.0147		
Copper	0.0675		
Mercury	0.00023		
Lead	0.0731		
Zinc	0.9868	*	
TOTAL PHENOLICS (4AAP)	0.0990		0.0990
CYANIDE	0.0005		0.0005
VOLATILE ORGANICS			0.1676
Methylene Chloride	0.0594		
Chloroform	0.0081		
Chlorodibromomethane	0.0010		
Dichlorobromomethane	0.0020		
1,1 dichloroethylene	0.0001		
trans 1,2 dichloroethylene	0.0042		
Tetrachloroethylene	0.0726		
1,2 dichlorobenzene	0.0168		
1,3 dichlorobenzene	0.0034		
EXTRACTABLE ORGANICS			0.4125
diethyl Phthalate	0.0305		
di-n-octyl Phthalate	0.1487		
bis (2-ethylhexyl) Phthalate	0.1959		
Benzylbutyl Phthalate	0.0066		
Naphthalene	0.0039		
Phenanthrene	0.0051		
Phenol	0.0218		
OC PESTICIDES			0.000389
A-BHC	0.000015		
B-BHC	0.000013		
G-BHC	0.000122		
Heptachlor	0.000036		
Oxy-Chlordane	0.000036		
p,p'DDE	0.000168		
Hexachlorobenzene	0.000001		
TOTAL LOADING			1.8223

NOTE: * denotes values above cut-off limits

McMaster Ave. Combined Sewer

Welland